## Gene Regulation

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Other Faculty Members

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### Major Scientific Interests of the Group

Our group studies the regulation of eukaryotic gene expression, focusing on how transcription regulates cell differentiation. In particular, we study the roles of transcription factors and epigenetic changes in regulating iPS cell induction as well as differentiation of adipocytes, chondrocytes and neural cells.

### Projects for Regular Students in Doctoral or Master's Programs

1) Mechanistic analyses of the roles for Oct4, Sox2, Klf4 and c-myc during iPS cell induction.
2) Analyses of epigenetic mechanisms of iPS cell induction.
3) Functional analyses of transcription factors involved in adipocyte commitment.
4) Development of efficient systems to generate chondrocytes and neural cells

### Study Programs for Short Stay Students (one week ~ one trimester)

1) Analysis of transcriptional regulation during adipocyte differentiation.
2) Induction of iPS cells using a Sendai virus-based vector.

### Recent Publications

1) **Kishimoto T**, **Nishimura K**, Morishita K, **Fukuda A**, Miyamae Y, Kumagai Y, Sumaru K, Nakanishi M, **Hisatake K**, Sano M: An engineered ligand-responsive Csy4 endoribonuclease controls transgene expression from Sendai virus vectors. **J. Biol. Eng.** 18(1):9 (2024).
2) **Sekiguchi Y**, **Fukuda A**, **Nishimura K**, **Hisatake K.** Engineering Critical Residues of SOX9 Discovers a Variant with Potent Capacity to Induce Chondrocytes. **Stem Cells** 41(12):1157-1170 (2023).
3) **Aizawa S**, **Nishimura K**, **Gonzalo SM**, **Kumar BA**, **Bui PL**, **Tran THY**, Kuno A, Muratani M, Kobayashi S, Nabekura T, Shibuya A, Sugihara E, Sato T, **Fukuda A**, **Hayashi Y**, **Hisatake K**: Early reactivation of clustered genes on the inactive X chromosome during somatic cell reprogramming. **Stem Cell Rep.** 17(1), 53-67 (2022).
4) **Bui PL**, **Nishimura K**, **Gonzalo SM**, **Kumar BA**, **Aizawa S**, Murano K, Nagata K, **Hayashi Y**, **Fukuda A**, Onuma Y, Ito Y, Nakanishi M, **Hisatake K**: Template Activating Factor-Iα Regulates Retroviral Silencing during Reprogramming. **Cell Rep.** 29(7), 1909-1922 (2019).
5) **Nishimura K**, Ishiwata H, **Sakuragi Y**, **Hayashi Y**, **Fukuda A**, **Hisatake K**: Live-cell imaging of subcellular structures for quantitative evaluation of pluripotent stem cells. **Sci. Rep.** 9, 1777 (2019).
6) **Nishimura K**, **Aizawa S**, **Nugroho FL**, **Shiomitsu E**, **Tran YTH**, **Bui PL**, **Borisova E**, **Sakuragi Y**, Takada H, Kurisaki A, **Hayashi Y**, **Fukuda A**, Nakanishi M, **Hisatake K**: A role for KLF4 in promoting the metabolic shift via TCL1 during induced pluripotent stem cell generation. **Stem Cell Rep.** 8(3), 787-801 (2017).
7) **Hayashi Y**, Hsiao EC, Sami S, Lancero M, Schlieve CR, Nguyen T, Yano K, Nagahashi A, Ikeya M, Matsumoto Y, **Nishimura K**, **Fukuda A**, **Hisatake K**, Tomoda K, Asaka I, Toguchida J, Conklin BR, Yamanaka S: BMP-SMAD-ID promotes reprogramming to pluripotency by inhibiting p16/INK4A-dependent senescence. **Proc. Natl. Acad. Sci. USA.** 113(46), 13057-13062 (2016).
8) **Nishimura K**, **Kato T**, **Chen C**, **Oinam L**, **Shiomitsu E**, **Ayakawa D**, Ohtaka M, **Fukuda A**, Nakanishi M, **Hisatake K**: Manipulation of KLF4 expression generates iPSCs paused at successive stages of reprogramming. **Stem Cell Rep.** 3(5), 915-929 (2014).